

**Practice: 578 - Stream Crossing****Scenario: #1 - Bridge****Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on cast in place concrete abutments, steel girders, and timber deck. Travel surface shall be wooden deck surface. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Span is 30 feet. Load is H-20. Width is 12 feet including curbs. Abutments are <= 6 feet. Use this option assumes permits require extensive stream diversion or pumping bypass during construction. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization, (561) Heavy Use Area, (382) Fence.

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross.

**Scenario Feature Measure:** square footage of bridge deck

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 360

**Scenario Cost:** \$16,467.74

**Scenario Cost/Unit:** \$45.74

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
	43				100	
<b>Equipment/Installation</b>						
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$94.71	8	\$757.68
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$54.77	16	\$876.32
Excavation, common earth, side cast, large equipment	1227	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.78	75	\$133.50
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.96	20	\$459.20
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$39.38	80	\$3,150.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$38.68	20	\$773.60
<b>Materials</b>						
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	\$0.96	4500	\$4,320.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$35.08	20	\$701.60
Dimension Lumber, untreated	1045	Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners.	Board Foot	\$0.73	2000	\$1,460.00
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$60.51	20	\$1,210.20

**Materials**

Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yard	\$103.82	18	\$1,868.76
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$252.16	3	\$756.48
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**Practice: 578 - Stream Crossing****Scenario: #2 - Culvert installation****Scenario Description:**

Install a new culvert. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. 36 inch Culvert installation with <75 cy of fill needed and < 2 yds rock riprap for headwalls. Pipe is 40 feet long. Use of this option assumes permits require extensive stream diversion or pumping bypass during construction. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows.

Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization. (561) Heavy Use Area, (382) Fence

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Typical crossing is 36" diameter pipe by 40 foot long. Practice payment based on diameter in inches times the length of pipe in feet.

**Scenario Feature Measure:** Culvert, inches diameter x length of pipe

**Scenario Unit:** Inch-Foot

**Scenario Typical Size:** 1,440

**Scenario Cost:** \$12,647.81

**Scenario Cost/Unit:** \$8.78

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Water management, Flooding & dewatering	969	Includes equipment, power unit and labor costs.	Acre Foot	\$230.82	20	\$4,616.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$111.56	10	\$1,115.60
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$5.62	18	\$101.16
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$38.68	20	\$773.60
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.96	20	\$459.20
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$35.08	50	\$1,754.00
Pipe, HDPE, CPT, Double Wall, Soil Tight, 36"	1248	Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$35.94	40	\$1,437.60
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$60.51	27	\$1,633.77
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$252.16	3	\$756.48

**Practice: 578 - Stream Crossing****Scenario: #3 - Ford with Water Management****Scenario Description:**

To install a stable crossing medium on channel bottom and approaches. Medium includes but not limited to precast concrete blocks, geocells, pavers, and gabions. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 12 feet for a total area as 420sf with total at 600sf. Use this option if permits require extensive stream diversion or pumping bypass during construction. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization, (561) Heavy Use Area, (382) Fence,

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross.

**Scenario Feature Measure:** low water crossing

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 600

**Scenario Cost:** \$10,525.18

**Scenario Cost/Unit:** \$17.54

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
	43				50	
<b>Equipment/Installation</b>						
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$94.71	2	\$189.42
Excavation, common earth, side cast, large equipment	1227	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.78	18	\$32.04
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.73	16	\$1,051.68
Water management, Flooding & dewatering	969	Includes equipment, power unit and labor costs.	Acre Foot	\$230.82	20	\$4,616.40
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$38.68	2	\$77.36
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.96	40	\$918.40
<b>Materials</b>						
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft, includes installation and delivery.	Cubic Yard	\$103.82	1.2	\$124.58
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$35.08	18	\$631.44
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$34.61	6	\$207.66
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$60.51	20	\$1,210.20
GeoCell, 4"	1054	Polymer 3-D cellular grid 4" deep that is filled with stone or earth. Includes materials, labor and equipment for the geocell only, does not include backfill.	Square Yard	\$29.32	50	\$1,466.00

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$252.16		\$0.00
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**Practice: 578 - Stream Crossing****Scenario: #4 - Ramp only****Scenario Description:**

Install a stable ramp for a channel crossing with a stable bottom. Medium includes but not limited to precast concrete blocks, geocells, pavers, and rip rap. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Approach stabilization paid by associated practices.

Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization, (561) Heavy Use Area, (382) Fence,

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

A 12' Wide ramp is installed at a 5:1 slope on a 4' bank height for a total area of 240 SF per approach or 480 SF total. Access road, animal trails and walkway, heavy use area and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Payment measured from top of ramp to toe of slope times design width using low bank to set top of ramp. Areas above this that need stabilization paid under associated practices.

**Scenario Feature Measure:** Square foot of approach

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 480

**Scenario Cost:** \$2,885.99

**Scenario Cost/Unit:** \$6.01

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$56.98	4	\$227.92
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$54.77	4	\$219.08
<b>Labor</b>						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$45.14	4	\$180.56
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$38.68	4	\$154.72
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$34.61	6	\$207.66
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$60.51	23	\$1,391.73
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$252.16	2	\$504.32

**Practice: 578 - Stream Crossing****Scenario: #5 - Ramps and channel****Scenario Description:**

Install a stable ramp and stabilize bottom for a channel crossing with an unstable bottom. Medium includes but not limited to precast concrete blocks, geocells, pavers, and rip rap. If a different travel surface is needed, refer to another appropriate standard for the surfacing. State permits have minimal requirements for water management during installation. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Approach stabilization paid by associated practices.

Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization, (561) Heavy Use Area, (382) Fence,

**Before Situation:**

Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

**After Situation:**

A 12' Wide ramp is installed at a 5:1 slope on a 4' bank height for a total area of 240 SF per approach or 480 SF total for ramps. In addition, a 30' long bottom is also stabilized for an additional 360 SF or a total of 600 SF. Access road, animal trails and walkway, heavy use area and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Payment measured from top of ramp to toe of slope times design width using low bank to set top of ramp plus the width of the channel bottom times the width. Areas above this that need stabilization paid under associated practices.

**Scenario Feature Measure:** SF of total crossing

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 600

**Scenario Cost:** \$3,093.80

**Scenario Cost/Unit:** \$5.16

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$56.98	4	\$227.92
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$54.77	5	\$273.85
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$38.68	5	\$193.40
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$45.14	5	\$225.70
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$34.61	8	\$276.88
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$60.51	23	\$1,391.73
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$252.16	2	\$504.32